GENERAL INDEX[1]

A

Absorption, water, by cotton, affected by soil and water temperature, 703
water, distribution of velocity in onion root, 1
Absorption coefficients, determination, 667
spectra, alpha and beta carotene, lycopene, 667
spectra, of single chloroplasts, 833
Abstracts, 224
Acid, indole-3-n-propionic, effect of ultraviolet radiation on, 509
Acid soils, aluminum toxicity reduced by phosphorus and lime, 173
Acid solutions, exchange of electrolytes with roots, 455
Acids, amino, in nutrition of excised tomato roots, 793
Activated diffusion, and auxin transport, 411
Activity, enzyme, in red clover, 685
ADDOMS, RUTH M., Nutritional studies of loblolly pine, 199
Adsorption, chromatographic method, L. ZECHMEISTER and L. v. CHOLNOKY, 563
Adsorption, dye, value of test in predetermining hardiness, 869
Age of roots, and rate of water absorption, 11
Air, ionized, effects on plants, 957
ALBERS, V. M., Absorption spectra of single chloroplasts in living cells in the region from 664 mμ to 704 mμ, 833
Alfalfa, continuous measurement of photosynthesis, respiration, transpiration, field conditions, 285
Aluminum toxicity, reduced by phosphorus and lime, 173
Amino acids, in nutrition of excised tomato roots, 793
Ammonia nitrogen, and growth of citrus cuttings, 167
Ammonium nitrogen, assimilation by roots of *Pandanus veitchii*, 899
Anatomy, leaf of tomato, 245
Annual election, 887
meeting, thirteenth, 221
Annual review of biochemistry, 891
Apical region of root, absorption of water, 6
Apparatus, agar threads for measurement of electrical polarity, 421
collecting and analyzing gas, 528
determining rate of decomposition of H_2O_2, 539
electrometer string circuit, 418
filtering radiations, 90
ionized air and ozone treatments, 965
measurement of CO_2, 287
of velocity of water absorption by roots, 4
of weak electric currents, 390, 391, 392
of P.D. in coleoptiles, 420
of rate of Blackman reaction, 538
photographing absorption spectra, 833
decrease in fluorescence, 510
potometer, 137
recording potentiometer, 487
spectrophotoelectric, 668
stirring gases within a closed chamber, 557
transpiration lag with changes in wind, 135
visual observations of stomata, 259
Apple, boron content of fruits at different stages of development, 218
calcium and boron contents of fruits related to blotchy cork, 553
quantity of ethylene present in fruits, 1004
ARNDT, C. H., Water absorption in the cotton plant as affected by soil and water temperatures, 703
Ash seeds, dormancy and germination, 813
Asparagine, 903
Assimilation, of ammonium and nitrate nitrogen, by roots of *Pandanus veitchii*, 899
Atmospheric SO_2, relation to photosynthesis, respiration, of alfalfa, 309
Austria, fifty years of plant physiology, 565
Autometer, for CO_2 measurement, 286

[1] Papers published in PLANT PHYSIOLOGY are indexed in *The Agricultural Index*, The H. W. Wilson Co., New York.

Auxin, polar transport, 737
transport, and electrical polarity, 409
Avena, coleoptile, electrical polarity and auxin transport, 737
Award, CHARLES REID BARNES life membership, 222
STEPHEN HALES prize, 222

B

Barley, 175
BARNES, CHARLES REID, life membership award, 222
committee, 1008
Basal region of roots, water absorption rate, 13
BEALL, RUTH, Exchange of electrolytes between roots and acid solutions, 455
BECK, WILLIAM A., Development of carotenoid pigments without the aid of light, 885
Beets, 173
Behavior, stomatal, effect of nutrient deficiencies, 253
Bibliography, minor elements, 892
Biochemistry, annual review, 891
of cellulose, polyuronides, lignin, etc. A. G. NORMAN, 1011
BLACKMAN, FREDERICK FROST, biographical sketch, 560
portrait, frontispiece April, plate II
reaction, nature in photosynthesis, 537
Blossom-end rot, tomatoes, and nutrient salt concentration, 21
Blotchy cork, incidence in apple fruits related to calcium and boron contents, 553
Boron content, apple fruits, at different stages of development, 218
as related to incidence of blotchy cork, 553
BRUNO, ALBERT, Potash deficiency symptoms, 1013
Bryophyllum, hardiness and dye-adsorption tests, 869

C

Calcium, content of apple fruits, as related to incidence of blotchy cork, 553
Calibration, for determination of absorption coefficients, 667
Canavalia ensiformis, urease distribution, 601
Cane, sugar, leaf temperatures, 989
Carbohydrate, changes in needles of *Pinus ponderosa* and *Pseudotsuga taxifolia*, 755
nutrition of wood-destroying fungi, 627
Carbon dioxide exchange, spectrographic method for determination, 213
Carotene, alpha and beta, absorption spectra, 667
Carotenoid pigments, development without light, 885
Carotenoids, 930
absorption spectra, 667
of peach, 215
Catalase activity, cranberries, 534
Cataphoresis, protoplasm, 111
Cations, intensity of removal, fractional electrodialysis, 979
Cell, pathology of plant, ERNST KÜSTER, 1013
Cells, contractile, of plants, SILVIA COLLA, 564
plant, frost-hardening mechanism, 51
Cellulose, biochemistry, A. G. NORMAN, 1011
Centrifuge, 112
Chamber, closed, method of stirring gases within, 557
Changes, carbohydrate, in needles of *Pinus ponderosa* and *Pseudotsuga taxifolia*, 755
Characteristics, nutritional, of wood-destroying fungi, 625
Chemical methods, 1008
Chlorate method for nitrogen, adapted to light, fluffy materials, 999
Chlorhydrin, ethylene, effect on *Elodea* and *Nitella*, 207
Chlorophyll content, in tomato leaves, 245
in Sultanina grapes and raisins, 1001
Chloroplasts, absorption spectra, 833
CHOLNOKY, L. v., Chromatographic adsorption method, 563
CHOLODNY, N. G., Influence of weak electric currents upon the growth of the coleoptile, 385
Chromatographic adsorption method, L. ZECHMEISTER and L. v. CHOLNOKY, 563

Citrus cuttings, growth in relation to nitrogen, 163
CLARK, W. G., Electrical polarity and auxin transport, 409
Polar transport of auxin and electrical polarity in coleoptile of *Avena*, 737
CLAUS, WALTER D., Mitogenetic radiations, 1014
CLINTON, GEORGE PERKINS, obit., 1010
Clover, red, enzyme activity, 685
Coefficients, absorption, determination, 667
correlation, growth of tomato, 243
Cold-hardened red clover, enzyme activity, 685
Cold resistance, factors affecting, 519
Coleoptile, growth, influence of weak electric currents, 385
of *Avena*, electrical polarity and auxin transport, 737
COLLA, SILVIA, Contractile cells of plants, 564
Color, of tomato and watermelon, environmental factors, 929
Committee, BARNES life membership, 1008
executive, 1008
finance, report, 223
legislative, 889
program, 1008
Concentration, hydrogen ion, 58, 151
nutrient salts, and growth and blossom-end rot, tomato, 21
Conditions, environmental, and development of tomato puffs, 875
CONNER, HERBERT W., Effect of light on solanine synthesis in the potato tuber, 79
Content, boron, of apples at different stages of development, 218
related to blotchy cork, 553
Contractile cells of plants, SILVIA COLLA, 564
COOPER, H. P., Intensity of removal of cations from cotton, corn, and soy bean tissue by fractional electro dialysis, 979
Copper sprays, and transpiration rate increase in tomato leaves, 853
Cork, blotchy, of apples, related to calcium and boron contents, 553
Corn, effects of x-rays, 117
tissue, intensity of cation removal, fractional electrodialysis, 979
Corporate seal, 889
Correlation coefficients, growth of tomato, 243
Cortex, *Pandanus veitchii*, distribution of nitrogen fractions and sugars, 899
Cotton, water absorption affected by soil and water temperatures, 703
tissue, intensity of cation removal, fractional electrodialysis, 979
Cranberries, gas content, 527
Cultures, solution, 163
water, 135
Currents, weak electric, influence on coleoptile growth, 385
Cuttings, citrus, growth in relation to nitrogen, 163

D

Deficiency, nutrient, and stomatal behavior, 253
symptoms, potash, OSKAR EPSTEIN, ALBERT BRUNO, and J. W. TURRENTINE, 1013
DELONG, W. A., Boron content of apples at different stages of development, 218
Calcium and boron contents of the apple fruit as related to the incidence of blotchy cork, 553
Denver meeting, 559, 887
Depression, freezing point, 53
DESAI, MANHER C., Effect of certain nutrient deficiencies on stomatal behavior, 253
Determination, plant enzymes, 845
Development, apples, boron content at different stages, 218
carotenoid pigments without light, 885
systemic, of tobacco mosaic, and host nutrition, 825
tomato puffs, environmental conditions, 875
Diagnosis, foliar, principles and practice, 571
Diffusion, activated, and auxin transport, 411
Distribution, absorption velocity in onion root, 1

nitrogen fractions, sugars, in stele and cortex of *Pandanus veitchii*, 899
urease in plants, 471
urease in *Canavalia ensiformis*, 601
Dormancy, in ash seeds, 813
Drawings, 562
Dues, early payment, 1007
DUNN, STUART, Factors affecting cold resistance in plants, 519
Value of the dye-adsorption test for predetermining the degree of hardiness, 869
Dye-adsorption test, value for predetermining hardiness, 869

E

ECKSTEIN, OSKAR, Potash deficiency symptoms, 1013
Efficiency, photosynthetic, effect of light intensity on tomato, 225
Election, annual, 887
Electric currents, weak, influence on coleoptile growth, 385
Electrical polarity, and auxin transport, 409, 737
Electrical properties, protoplasm, 111
Electrodialysis, fractional, intensity of cation removal from cotton, corn, soy bean tissue, 979
Electrolytes, 58
exchange between roots and acid solutions, 455
Elements, minor, bibliography, 892
Elodea, effect of ethylene chlorhydrin and thiourea, 207
Elongation, of seedling radicles, seasonal variation, 997
EMERSON, ROBERT, Nature of the Blackman reaction in photosynthesis, 537
EMMERT, E. M., Application of the chlorate method for determining nitrogen to light, fluffy materials, 999
Environmental factors, and color of tomato and watermelon, 929
Enzyme activity, red clover, 685
Enzymes, plant, determination, 833
Equilibrium, flux, proof of relation, 861
Errata, 1008
ESSELEN, WM. B., Gas content of cranberries and possible relationship of respiratory activity to keeping quality, 527
Ethylene, and color development in tomato, 941
effect on respiration and ripening of pears, before and after storage, 441
quantity present in apples, 1004
Ethylene chlorhydrin, effect on *Elodea* and *Nitella*, 207
Exchange, carbon dioxide, spectrographic method for determination, 213
Exchange, of electrolytes between roots and acid solutions, 455
Excised root tips, tomato, amino acids in nutrition, 793
seasonal fluctations in growth rate, 183
survival at suboptimal and supraoptimal temperatures, 771
vitamin B_1 in nutrition, 803
yeast materials essential for growth, 777
Executive committee, 1008
Expression, sexual, in *Lychnis dioica* with hydrogen ion concentration, 151

F

Factors, environmental, and color of tomato and watermelon, 929
in varietal susceptibility, walnuts to walnut-husk fly, 721
FELLERS, C. R., Gas content of cranberries and possible relationship of respiratory activity to keeping quality, 527
Fifty years, plant physiology in Austria, 565
Filters, light, 86
Finance committee, report, 223
Fluctuations, seasonal, in growth rate of excised tomato root tips, 183
Flux equilibrium, proof of relation, 861
Fly, walnut-husk, varietal susceptibility of walnut fruits, 721
Foliar diagnosis, principles and practice, 571
Fomes pinicola, nutritional characteristics, 625
FOSTER, ARTHUR C., Environmental conditions influencing the development of tomato pockets or puffs, 875
Forum, teachers', 1005

Fractional electrodialysis, intensity of of cation removal from cotton, corn, soy bean, 979
Fractions, nitrogen, distribution in stele and cortex of *Pandanus veitchii*, 899
Fraxinus seeds, dormancy and germination, 813
Free water, 54
Freezing, cranberries, and composition of internal atmosphere, 528
Freezing point depression, 53
Frost-hardening, mechanism, 51
Fruit, apple calcium and boron contents as related to blotchy cork, 553
tomato, blossom-end rot related to nutrient salt concentration, 21
Fruits, walnut, varietal resistance to walnut-husk fly, 721
Fungi, wood-destroying, nutritional characteristics, 625

G

Gas content, cranberries, 527
Gases, method of stirring within a closed chamber, 557
metabolic, effect on respiration and ripening of pears, 441
Geoelectric effect, 430
Germination, and dormancy of ash seeds, 813
GILBERT, BASIL E., Increase of transpiration rates of tomato leaves due to copper sprays, 853
GRANICK, SAM, Urease distribution in plants: general methods, 471
Urease distribution in *Canavalia ensiformis*, 601
Grapes, Sultanina, chlorophyll in, 1001
GREATHOUSE, GLENN A., Enzyme activity in cold-hardened and unhardened red clover, 685
GREEN, LOWELL, Nature of the Blackman reaction in photosynthesis, 537
Growth, citrus cuttings in relation to nitrogen, 163
coleoptile, influence of weak electric currents, 385
effect of hydrogen ion on wood-destroying fungi, 631
effect of phenolic compounds on wood-destroying fungi, 635
photoperiodic stimulation, and winter killing, 881
rates, seasonal fluctuations in excised tomato root tips, 183
responses, tomato, 229
temperature, effect on cold resistance, 522
tomato, and nutrient salt concentration, 21
tomato roots, materials essential extracted from yeast, 777
wheat, monograph on, H. L. VAN DE SANDE BAKHUYZEN, 893
Guttation, tomato, 32

H

HAAS, A. R. C., Nitrogen in relation to the growth of citrus cuttings in solution cultures, 163
Factors in varietal susceptibility of walnut fruits to attack by the walnut-husk fly, 721
HALES, STEPHEN, award, 222
HANSEN, ELMER, Effect of ethylene and certain metabolic gases upon respiration and ripening of pears before and after cold storage, 441
Hardening, frost, mechanism, 51
Hardiness, degree, value of dye-adsorption test in predetermining, 869
HARE, DOROTHY, Effect of ultraviolet radiation on indole-3-n-propionic acid, 509
HARTMAN, HENRY, Effect of ethylene and certain metabolic gases upon respiration and ripening of pears before and after cold storage, 441
HILL, GEORGE R., The continuous measurement of photosynthesis, respiration, and transpiration of alfalfa and wheat growing under field conditions, 285
Relation of sulphur dioxide in the atmosphere to photosynthesis and respiration of alfalfa, 309
HOLLAENDER, ALEXANDER, Mitogenetic radiations, 1014
HOMAN, CLYDE, Effects of ionized air and ozone on plants, 959
Host nutrition, and systemic development of tobacco mosaic, 825

Humin nitrogen, 904
Hydrogen ion concentration, 58
and growth of wood-destroying fungi, 631
and sexual expression, 151
in walnut husk juice, 722
Hydrophily, of protoplasm, 60

I

Ice pressure, injury, 65
Illumination, 100
Indianapolis meeting, 559, 1007
Indicator method, urease distribution, 472
Indole-3-n-propionic acid, effect of ultraviolet radiation on, 509
irradiated, effect on roots, 513
Injury, from ice pressure, 65
from stress, 66
Intensity, light,, effect on photosynthetic efficiency of tomato, 225
of removal of cations, by fractional electrodialysis, 979
Ionized air, effects on plants, 957
Irradiation, and structural changes in soy bean leaf tissues, 191
Isolated tomato roots, materials essential for growth from yeast, 771
nutrition, amino acids, 793
vitamin B_1, 803
seasonal fluctuations in growth rates, 183
survival at suboptimal and supraoptimal temperatures, 771

J

JOHNSON, EDNA LOUISE, Tuberization of the Colorado wild potato as affected by x-radiation, 547
JOHNSON, J. C., Boron content of apples at different stages of development, 218

K

Keeping quality, cranberries, and respiratory activity, 527
KERSTEN, H., Structural changes produced in leaf tissue of soy bean plants by irradiation of the dry seeds with soft x-rays, 191
Effect of ultraviolet radiation on indole-3-n-propionic acid, 509
KERTESZ, Z. I., On the determination of plant enzymes, 845
KNORR, H. V., Absorption spectra of single chloroplasts in living cells in the region from 664 mμ to 704 mμ, 833
KRAMER, PAUL J., Photoperiodic stimulation of growth by artificial light as a cause of winter killing, 881
KRAUSCHE, KENNETH K., Increase of transpiration rates of tomato leaves due to copper sprays, 853
KRAUSS, B. H., Assimilation of ammonium and nitrate nitrogen from solution cultures by the roots of *Pandanus veitchii* Hort., and distribution of the various nitrogen fractions in the stele and cortex, 899
KÜSTER, ERNST, Pathology of the plant cell, 1013

L

LAFUZE, H. H., Nutritional characteristics of certain wood-destroying fungi, *Polyporus betulinus* Fr., *Fomes pinicola* (Fr.) Cooke, and *Polystictus versicolor* Fr., 625
Lag, in water absorption with changes in wind, 135
Lake method, urease distribution, 475
Leaf anatomy, tomato, 245
temperatures, sugar cane, 989
tissue, structural changes from irradiation, soft x-rays, 191
Leaves, tomato, transpiration rate increase due to copper sprays, 853
Legislative committee, 889
Lemon, nitrogen and growth of cuttings, 163
Lens, Spierer, 106
LEVITT, J., Frost-hardening mechanism of plant cells, 51
Life membership award, 222
committee, BARNES, 1008
Light, absence and development of carotenoid pigments, 885
and color production in tomato, 949
artificial, photoperiodic stimulation and winter killing, 881

effect on solanine synthesis, potato tubers, 79
filters, 86
intensity, effect on photosynthetic efficiency of tomato, 225
Lignin, biochemistry, A. G. NORMAN, 1011
Lime, in reducing aluminum toxicity, acid soils, 173
LINSBAUER, L., Fifty years of plant physiology in Austria, 565
LIVINGSTON, BURTON E., Lag in water absorption by plants in water culture with respect to changes in wind, 135
Loblolly pine, nutritional studies, 199
LONG, THEO. P., Structural changes produced in leaf tissue of soy bean plants by irradiation of the dry seeds with soft x-rays, 191
LOOMIS, W. E., Methods in plant physiology, 224
LUBIMENKO, VLADIMIR NIKOLAEVITCH, Portrait, frontispiece October, plate IV
Plant physiology in the U.S.S.R., 895
Obit., 1009
Lychnis dioica, sexual expression and hydrogen ion concentration, 151
LYON, CHARLES J., A teachers' forum, 1005
Lycopene, absorption spectra, 667

M

MACKINNEY, G., Carotenoids of the peach, 215
Chlorophyll in Sultanina grapes and raisins, 1001
MARCY, BEATRICE, Effect of ethylene chlorhydrin and thiourea on *Elodea* and *Nitella*, 207
MARSH, GORDON, Proof of the flux equilibrium relation, 861
MARTIN, WILLIAM E., Method of stirring gases within a closed chamber, 557
MCALISTER, E. D., Spectrographic method for determining carbon dioxide exchange between an organism and its surroundings, 213
MCCARTY, EDWARD C., obit., 890
Measurement, of absorption spectra, 667
of photosynthesis, respiration, transpiration in alfalfa and wheat, under field conditions, 285
Mechanism, frost-hardening of plant cells, 51
Meeting, Denver, 559, 887
Indianapolis, 559, 1007
thirteenth annual, 221
Membership, BARNES life, committee, 1008
life, award, 222
Method, chlorate, for nitrogen, applied to light, fluffy materials, 999
chromatographic adsorption, L. ZECHMEISTER and L. v. CHOLNOKY, 563
determination of absorption coefficients, 667
spectrographic, for determining carbon dioxide exchange, 213
stirring gases within a closed chamber, 557
Methods, chemical, 1008
in plant physiology, W. E. LOOMIS and C. A. SHULL, 224
research on protoplasm, 99
sampling visible radiation, 647
urease distribution in plants, 471
Microdissection, 109
Microscope, ultraviolet, 100
tandem and inverted, 108
MILLER, ELMER S., A precise method, with detailed calibration for the determination of absorption coefficients; the quantitative measurement of the visible and ultraviolet absorption spectra of alpha carotene, beta carotene, and lycopene, 667
Mineral nutrition, wood-destroying fungi, 631
Minor elements, bibliography, 892
MITCHELL, JOHN W., Method of stirring gases within a closed chamber, 557
Mitogenetic radiation, ALEXANDER HOLLAENDER and WALTER D. CLAUS, 1014
MOLISCH, HANS, biographical sketch, 889
portrait frontispiece July, plate III
Monograph on growth of wheat, H. L. VAN DE SANDE BAKHUYZEN, 892
MORELAND, C. F., Leaf temperatures of sugar cane, 989
Mosaic, tobacco, host nutrition and systemic development, 825

N

Nature and properties of soils, T. L. LYON and H. O. BUCKMAN, 893
Needles, *Pinus ponderosa* and *Pseudotsuga taxifolia*, carbohydrate changes, 755
NELSON, R. C., The quantity of ethylene in apples, 1004
New England section, 559, 888
Nitella, effect of ethylene chlorhydrin and thiourea, 207
Nitrate nitrogen, assimilation by roots of *Pandanus veitchii*, 899
  growth of citrus cuttings, 163
Nitrite nitrogen, growth of citrus cuttings, 169
Nitrogen, ammonium and nitrate, assimilation by roots of *Pandanus veitchii*, 899
  determination, chlorate method, application to light, fluffy materials, 999
  fractions, 903
  growth of citrus cuttings, 163
  nutrition, and growth of wood-destroying fungi, 629
NORMAN, A. G., Biochemistry of cellulose, polyuronides, lignin, etc., 1011
Nutrient deficiencies, and stomatal behavior, 253
  salt concentration, and growth and blossom-end rot of tomato, 21
Nutrition, carbohydrate, wood-destroying fungi, 627
  excised tomato roots, amino acids, 793
    vitamin B_1, 803
  host, and systemic development of tobacco mosaic, 825
  mineral, wood-destroying fungi, 631
  mineral, effect on cold resistance, 520
  nitrogen, wood-destroying fungi, 629
Nutritional characteristics, wood-destroying fungi, 625
  studies, loblolly pine, 199

O

Onion root, distribution of velocity of water absorption, 1
Orange, nitrogen and growth of cuttings, 166
Organism, carbon dioxide exchange, spectrographic method of determination, 213
Osmotic values, relation to frost resistance, 53
  tomato tissue juice, 39
OVERTON, JAMES BERTRAM, obit., 561
Oxidation, carotenoid solutions, 680
Oxidation-reduction, by wood-destroying fungi, 633
Oxygen concentration, and color development in tomato, 946
Ozone, effects on plants, 957

P

PADEN, W. R. Intensity of cation removal from cotton, corn, and soy bean tissue by fractional electrodialysis, 979
Pandanus veitchii, assimilation of ammonium and nitrate nitrogen by roots, 879
Pathology, of plant cell, ERNST KÜSTER, 1013
Patrons, 562
Payment of dues, early, 1007
Peach, carotenoids, 215
Phenolases, plant, 499
Phenolic compounds, and growth of wood-destroying fungi, 635
Phosphorus, in reducing aluminum toxicity, acid soils, 173
Photochemical decomposition, carotenoids, 676
Photography, 113
Photoperiodic stimulation, and winter killing, 881
Photosynthesis, alfalfa, relation of atmospheric sulphur dioxide, 309
  continuous measurement, alfalfa and wheat, field conditions, 285
  nature of Blackman reaction, 537
Photosynthetic efficiency of tomato, effect of light intensity, 225
Physical properties of protoplasm, methods of research, 99
Physiology, plant, fifty years in Austria, 565
  in U.S.S.R., 895
Phytohormones, F. W. WENT and KENNETH V. THIMANN, 1012

Pigments, carotenoid, development without light, 885
Pine, loblolly, nutritional studies, 199
Pinus ponderosa, needles, carbohydrate changes, 755
Plant, cotton, water absorption affected by soil and water temperature, 703
Plant cell, pathology, ERNST KÜSTER, 1013
enzymes, determination, 845
frost-hardening mechanism, 51
phenolases, 499
physiology, fifty years of, in Austria, 565
in U.S.S.R., 895
Plants, cold resistance in, factors affecting, 519
contractile cells of, SILVIA COLLA, 564
effects of ionized air and ozone, 957
tomato, light intensity effect on photosynthetic efficiency, 225
urease distribution in, 471
Pockets, tomato, environmental conditions and development, 875
Polariscope, 108
Polarity, electrical, and auxin transport, 409, 737
Polar transport, auxin, 737
Polyporus betulinus, nutritional characteristics, 625
Polystictus versicolor, nutritional characteristics, 625
Polyuronides, biochemistry, A. G. NORMAN, 1011
PORTER, ALTON MILLETT, Effect of light intensity on the photosynthetic efficiency of tomato plants, 225
Potash deficiency symptoms, OSKAR ECKSTEIN, ALBERT BRUNO, and J. W. TURRENTINE, 1013
Potassium, excess and stomatal behavior, 272
Potato, Colorado wild, tuberization affected by x-radiation, 547
tuber, solanine synthesis, effect of light, 79
Potentiometer, recording, for use in physiological investigations, 487
Potometer, 137
Pseudotsuga taxifolia, needles, carbohydrate changes, 755
Practice, of foliar diagnosis, 571
Principles, of foliar diagnosis, 571
Program committee, 1008
Properties, electrical, of protoplasm, 111
physical, of protoplasm, methods of research, 99
Protoplasm, methods of research on physical properties, 99
Protoplasmic streaming, and auxin transport, 411
Puffs, tomato, environmental conditions and development, 875

Q

Quality, keeping, cranberries, and respiratory activity, 527
Quantitative measurement, absorption spectra, carotene and lycopene, 667
Quantity, of ethylene in apples, 1004

R

Radiation, mitogenetic, ALEXANDER HOLLAENDER and WALER D. CLAUS, 1014
ultraviolet, effect on indole-3-n-propionic acid, 509
Radiations, visible, methods of sampling, 647
Radicles, seedling, seasonal variation in elongation, 997
RAINES, M. A., Seasonal variation in elongation of young seedling radicles, 997
Raisins, Sultanina, chlorophyll in, 1001
Rate, transpiration, increase due to copper sprays, 853
Reaction, Blackman, nature of, in photosynthesis, 537
Recording potentiometer, for use in physiological investigations, 487
Removal, cation, by fractional electrodialysis, 979
Report, finance committee, 223
Research on protoplasm, physical methods, 99
Resistance, to dehydration, 57
to ice formation, 52
to mechanical effects, 65
Resistance, cold, factors affecting, 519

Respiration, alfalfa, relation of atmospheric sulphur dioxide, 309
continuous measurement, alfalfa and wheat, under field conditions, 285
pears, influence of ethylene and metabolic gases, 441
Respiratory activity, cranberries, and keeping quality, 527
Review, annual, of biochemistry, 891
Ripening, of pears, influence of ethylene and metabolic gases, 441
ROBBINS, W. REI, Relation of nutrient salt concentration to growth of the tomato and to the incidence of blossom-end rot of the fruit, 21
Root, onion, distribution of velocity of water absorption, 1
development, tomato, 31
tips, excised tomato, seasonal fluctuations in growth rate, 183
Roots, exchange of electrolytes with acid solutions, 455
of *Pandanus veitchii*, assimilation of ammonium and nitrate nitrogen, 879
tomato, amino acids in nutrition, 793
separation from yeast of materials essential to growth, 777
vitamin B_1 in nutrition, 803
ROSENE, HILDA F., Distribution of the velocities of absorption of water in the onion root, 1
Rot, blossom-end of tomato, related to nutrient salt concentration, 21
RUSSELL, MARY A., Effects of X-rays on *Zea mays*, 117

S

Salt concentration, nutrients, and growth and incidence of blossom-end rot of tomato, 21
SAMISCH, RUDOLF M., Contribution to the knowledge of plant phenolases, 499
Sampling visible radiations, methods, 647
SANKEWITSCH, E. CH., Influence of weak electric currents upon the growth of the coleoptile, 285
SCARTH, G. W., Frost-hardening mechanism of plant cells, 51
Seal, corporate, 889
Seasonal fluctuations, in growth rates of excised tomata root tips, 183
variation, elongation of seedling radicles, 997
Section, New England, 559, 888
Western, 559
Seedling radicles, elongation, seasonal variation, 997
Seeds, dry soy bean, structural modifications of leaves from irradiation, 191
ash, dormancy and germination, 813
SEIFRIZ, WILLIAM, Methods of research on the physical properties of protoplasm, 99
Selection by vegetative propagation, effect on cold resistance, 523
Senescence, 580
Sexual expression, in *Lychnis dioica*, and hydrogen ion concentration, 151
SHULL, CHARLES A., Methods in plant physiology, 224
SIDERIS, C. P., Assimilation of ammonium and nitrate nitrogen from solution cultures by roots of *Pandanus veitchii* Hort., and distribution of nitrogen fractions and sugars in the stele and cortex, 899
SMITH, R. L., Intensity of removal of cations from cotton, corn, and soy bean tissue by fractional electrodialysis, 979
Soil, acid, reduction of aluminum toxicity by phosphorus and lime, 173
moisture, effect on cold resistance, 520
temperature, and water absorption in cotton, 703
Soils, nature and properties, T. L. LYON and H. O. BUCKMAN, 893
Solanine, synthesis in potato tuber, effect of light, 79
Solution cultures, nitrogen and growth of citrus cuttings, 163
Solutions, acid, exchange of electrolytes with roots, 455
Soy bean tissue, intensity of cation removal, fractional electrodialysis, 979
leaf, structural changes from irradiation, soft x-rays, 191

Spectra, absorption, measurement, 667
of single chloroplasts, 833
Spectrographic method, for determining carbon dioxide exchange, 213
SPENCER, ERNEST L., Influence of host nutrition on systemic development of tobacco mosaic, 825
Spierer lens, 106
Sprays, copper, and transpiration rate increase in tomato leaves, 853
Stages of development, apples, boron content, 218
STANFIELD, J. FISHER, Hydrogen ion concentration and sexual expression in *Lychnis dioica* L., 151
STEINBAUER, GEORGE P., Dormancy and germination of *Fraxinus* seeds, 813
Stele, *Pandanus veitchii*, distribution of nitrogen fractions and sugars, 899
Stimulation, photoperiodic, and winter killing, 881
Stomata, night opening, 272
Stomatal behavior, effect of nutrient deficiencies, 253
Storage, pears, influence of ethylene and metabolic gases on respiration and ripening, 441
conditions, and vitality of ash seeds, 822
period, cranberries, and composition of internal atmosphere, 531
Streaming, protoplasmic, and auxin transport, 409
effect of ethylene chlorhydrin and thiourea, 207
Structural changes, soy bean leaf tissues, from irradiation, 191
STUART, NEIL W., Enzyme activity in cold-hardened and unhardened red clover, 685
Submergence, cranberries, and composition of internal atmosphere, 528
Suboptimal temperature, and survival of tomato roots, 771
Sugar cane, leaf temperatures, 989
Sugar concentration, and frost hardiness, 59
Sugars, distribution in stele and cortex of *Pandanus veitchii*, 899
Sulphur dioxide, relation to photosynthesis and respiration, alfalfa, 309
Sultanina grapes, raisins, chlorophyll in, 1001
Sunburn, of potatoes, 91
Supercooling, 52
Supraoptimal temperatures, and survival of tomato roots, 771
Surroundings, carbon dioxide exchange with organism, spectrographic method, 213
Survival, tomato roots at suboptimal and supraoptimal temperatures, 771
Susceptibility, varietal, walnuts to walnut-husk fly, 721
Symptoms, potash deficiency, OSKAR ECKSTEIN, ALBERT BRUNO, and J. W. TURRENTINE, 1013
Synthesis, solanine in potato tubers, effect of light, 79
Systemic development of tobacco mosaic, host nutrition influence, 825

T

TATMAN, EVERETT C., Environmental conditions influencing the development of tomato pockets or puffs, 875
Teachers' forum, 1005
Temperature, effect on respiration, 302
of growth, effect on cold resistance, 522
of leaf, sugar cane, 989
of soil and water, and water absorption in cotton, 703
of storage, and composition of internal atmosphere of cranberries, 531
and color development of tomato, 935
and color development of watermelon, 940
and growth of maize after x-ray treatments, 124
and survival of tomato roots, 771
and wilting, 705
THIMANN, KENNETH V., Phytohormones, 1012
Thiourea, effect on *Elodea* and *Nitella*, 207
Thirteenth annual meeting, 221
THOMAS, MOYER D., The continuous measurement of photosynthesis, respiration and transpiration of alfalfa and wheat growing under field conditions, 285
Relation of sulphur dioxide in the

atmosphere to photosynthesis and respiration of alfalfa, 309
THOMAS, WALTER, Foliar diagnosis: principles and practice, 571
Tips, excised tomato roots, seasonal fluctuations of growth rate, 183
Tissue, cotton, corn, soy bean, intensity of removal of cations, by fractional electrodialysis, 979
soy bean leaf, structural changes from irradiation of dry seeds, 191
Tobacco mosaic, host nutrition influence on systemic development, 825
Tomato, color, and environmental factors, 929
excised root tips, seasonal fluctuations in growth rate, 183
growth and blossom-end rot, related to nutrient salt concentration, 21
leaves, transpiration rate increase due to copper sprays, 853
plants, effect of light intensity on photosynthetic efficiency, 225
pockets, or puffs, environmental conditions and development, 875
roots, excised, amino acids in nutrition, 793
materials essential for growth extracted from yeast, 777
survival at suboptimal and supraoptimal temperatures, 771
vitamin B_1 in nutrition, 803
Toxicity, aluminum, reduced in acid soils by phosphorus and lime, 173
Transpiration, 302
continuous measurement, alfalfa and wheat, under field conditions, 285
rate increase, tomato, due to copper sprays, 853
Transport, auxin, and electrical polarity, 409
polar, of auxin, 737
TRAVIS, C. W., Seasonal variation in elongation of young seedling radicles, 997
TRUE, RODNEY HOWARD, biographical sketch, 222
portrait, frontispiece January, plate I
Tuber, potato, synthesis of solanine, effect of light, 79
Tuberization, Colorado wild potato, as affected by x-radiation, 547
Turgor, in tomato, 32
TURRENTINE, J. W., Potash deficiency symptoms, 1013

U

Ultraviolet, absorption spectra, alpha and beta carotene, lycopene, 667
microscope, 100
radiation, effect on indole-3-n-propionic acid, 509
Unhardened red clover, enzyme activity, 685
Urease distribution, in *Canavalia ensiformis*, 601
in plants, 471

V

Vacation, 563
Values, osmotic, 39, 53
Variation, seasonal, in elongation of young seedlings radicles, 997
Varietal susceptibility, walnut fruits to walnut-husk fly, 721
Variety, cranberries, and composition of internal atmosphere, 531
Velocity, of water absorption, distribution in onion rot, 1
Visible radiations, methods of sampling, 647
Vitality, of ash seeds, and storage conditions, 822
Vitamin B_1, in nutrition of excised tomato roots, 803
VOGELE, A. C., Effect of environmental factors upon the color of the tomato and the watermelon, 929

W

WALLACE, RAYMOND H., A recording potentiometer for use in physiological investigations, 487
Methods of sampling visible radiations, 647
Walnut fruits, varietal susceptibility to wanlut-husk fly, 721
Walnut-husk fly, varietal susceptibility of walnut fruits to, 721

Water, free, and frost hardening, 54
temperature, affecting water absorption in cotton plant, 703
Water absorption, in cotton, affected by soil and water temperatures, 703
distribution of velocities in onion root, 1
lag with changes in wind, 135
Water cultures, lag of water absorption by plants, with wind changes, 135
Watermelon, color, and environmental factors, 929
WENT, F. W., Phytohormones, 1012
Wheat, 295
continuous measurement, photosynthesis, respiration, transpiration, grown under field conditions, 285
monograph on growth, H. L. VAN DE SANDE BAKHUYZEN, 892
WHITE, PHILIP R., Seasonal fluctuations in growth rates of excised tomato root tips, 183
Survival of isolated tomato roots at suboptimal and supraoptimal temperatures, 771
Separation from yeast of materials essential for growth of isolated tomato roots, 777
Amino acids in the nutrition of excised tomato roots, 793
Vitamin B_1 in the nutrition of excised tomato roots, 803
WILSON, J. D., Lag in water absorption by plants in water culture with respect to changes in wind, 135
Wilting, and temperature, 705
Wind changes, and lag in water absorption, 135
Winter killing, artificial light as cause by photoperiodic stimulation, 881
Wood-destroying fungi, nutritional characteristics, 625
WORLEY, CLAIR L., Carbohydrate changes within the needles of *Pinus ponderosa* and *Pseudotsuga taxifolia*, 755

X

X-radiation, and tuberization of Colorado wild potato, 547
X-rays, effect on *Zea mays*, 117
soft, structural modifications in leaf tissue of soy bean, from irradiation of dry seeds, 191

Y

Yeast, extraction of essential materials for growth of tomato roots, 777
YOUNG, H. Y., Assimilation of ammonium and nitrate nitrogen from solution cultures by roots of *Pandanus veitchii* Hort., and distribution of the various nitrogen fractions and sugars in the stele and cortex, 899

Z

Zea mays, effects of x-rays, 117
ZECHMEISTER, L., Chromatographic adsorption method, 563